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ARTIFICIAL INTELLIGENCE AS THE CATALYST OF DIGITAL PAYMENTS IN THE REVOLUTION INDUSTRY 4.0

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ABSTRACT. *In the era of the revolution industry 4.0, artificial intelligence can be used as one of the driving forces so that the revolution industry 4.0 can run properly. Artificial intelligence is more towards something sophisticated which is created by humans with a programming system where everything can be done automatically. This artificial intelligence was created with the aim that every task performed by humans can be carried out by a robotic system that is able to identify an action based on natural language processes, speech recognition, sensor systems, computer vision, intelligent computers and so on. Artificial intelligence plays an important role in solving problems that are practical and easy for every human to understand because basically artificial intelligence is a very good method for learning, reasoning, and perception for every problem that occurs. The phenomenon of using artificial intelligence and machine learning is an overview of the direction of the development of digital payment services in Indonesia in the future. The revolution industrial era 4.0 brought changes to the shifting payment transaction methods in Indonesia.*

Keywords: Revolution industry 4.0, Artificial intelligence, Digital payment, Catalyst, Banking

1. Introduction. Facing the current era of change also known as VUCA, adjustments need to be made to keep up with the changes that have occurred. Therefore, every industry must change all the current system applications into a more sophisticated and automated system.

Humans have intelligence in solving problems because humans have knowledge and experience that becomes learning in life. The more that is known, the ability to solve problems becomes real. However, having knowledge alone is not enough without being supported by experience, and vice versa. Basically, humans are given the ability to think so that they can reason in making fast and correct decisions [1]. In the revolution industry 4.0, there was a necessity that required us to make adjustments in the era of digitalization. Every industry is required to be creative so that it can create innovations so that the production system in the industry can be well integrated with one another. Even the

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innovations created are able to reduce company operating costs. Thus, the company can make cost efficiency and increase profits. Companies need to pay attention to the quality of their workforce by providing training to keep up with rapidly developing technology. The revolution industry 4.0 will bring big changes along with the emergence of artificial intelligence which will increasingly develop its implementation in the industry [2]. The current development in digital is a must to adapt in the business world considering the impact of the COVID-19 pandemic where all the activities we used to do in the pre-pandemic era are likely to change in the new normal era. The community will adapt to carry out activities through technology created from artificial intelligence such as digital payments [3].

By looking at economic data in Indonesia, the value of e-commerce transactions continues to rise, starting from an increase of 152% in 2018 and 88% in 2019. In the first semester of 2020 there was an increase in e-commerce transactions by twofold compared to the previous period, it is necessary to disseminate the digitalization of payments, so that solutions and adaptations to the pandemic period show that the increasing demand for online shopping becomes easier.

2. Literature Review. Artificial intelligence refers to simulation of human intelligence in machine that is programmed to make computer systems like living things (humans). Historical data are stored in computers that can be used in the programming process and restore systems that have not been running well. Then this system will be tested in a project so that the development of the existing system can be seen and the system's capabilities can be improved so that features can be added to make it easier for users [4].

In the current era of change, many industrial sectors need artificial intelligence to be implemented in their industries so that they can survive to keep up with the times that are completely automated. All processes in the industry can be neatly scheduled and monitored.

There are several types that need to be known in artificial intelligence, namely [5]:

- 1) Skill system
- 2) Natural language process
- 3) Speech recognition
- 4) Sensor system
- 5) Computer vision
- 6) Intelligent computer
- 7) Game playing
- 8) Soft computing

Artificial intelligence can be grouped into 2 different types of groups, namely weak and strong. Artificial intelligence that is classified as weak or can also be called narrow is a system designed and intended to do something that has been ordered to be done. Conversely, artificial intelligence that is classified as strong or can also be called intelligence that is made widely and generally is a system with sophistication that is made more familiar to the public. The intelligence system can be said to be strong if every order can be carried out systematically without any help from humans. An assistant professor of integrative biology and computer science and engineering at Michigan State University named Arend Hintze, classifies artificial intelligence into 4 intelligence groups, namely [6]:

Type 1: Reactive engine.

Every action is done by utilizing the memory power of each memory in the past. An example of this reactive machine is a smart system created by IBM where the system can compete and beat international chess champions. The system created by IBM was able to guess every move of a chess pawn.

Type 2: Limited memory

Limited memory, namely every action is performed based on the ability to remember every event in the past. An example of this limited memory is a car where there is no driver but steering control is carried out by a system program that can see the direction and control the speed according to the limits of safe driving.

Type 3: Theory of mind

Theory of mind is a science to understand the thoughts and reactions of people when interacting with their surroundings. This theory of mind is able to influence other people to do what we want.

Type 4: Self-awareness

The development of artificial intelligence is carried out with the aim of being able to remember the past and be able to take lessons from every life experience, for example, the use of artificial intelligence in the banking world. Collaboration between the banking sector and artificial intelligence companies such as financial technology (fintech) is becoming a trend that will be carried out at this time.

Over the years artificial intelligence has experienced very significant developments. More and more people are active and understand the digital world. Artificial intelligence technology was developed with the aim of helping people fulfill their needs more practically and efficiently [7]. The application of artificial intelligence to the industry including the fintech industry is a very brilliant idea. With this artificial intelligence, a P2P lending fintech can easily select borrowers' eligibility with the big data they have. Data related to consumer finances combined with existing big data can produce estimated criteria regarding the behavior of prospective borrowers towards the loan being proposed. Therefore, to know and understand this artificial intelligence technology to the fintech industry is one of the requirements that must be done by those who will adapt this system.

3. Methodology. The research was conducted to determine the important role of artificial intelligence in the world of digital payment, whether artificial intelligence is capable of being a catalyst for digital payments in the revolution industry 4.0 or not. This research also looks at the convenience obtained from the creation of digital payment innovations as an effect of artificial intelligence adapting to changing times so that it can be a solution to solve existing problems. The objectives of this study are as follows:

- a) Knowing the definition of artificial intelligence
- b) Knowing the purpose of using artificial intelligence
- c) Knowing the strengths and weaknesses of implementing artificial intelligence
- d) Knowing the role of artificial intelligence when implemented in digital payments in the era of revolution industry 4.0
- e) What is the role of digital payment as a means of payment that is carried out now?

4. Result and Discussion. The main goal of developing artificial intelligence is how to make technology efficient and easier for humans. Artificial intelligence greatly helps the dignity of human life, because it has the potential to provide great benefits to humans such as acceleration in production, increasing service to customers, and ultimately increasing revenue [8].

In the revolution industry 4.0 era, there were major changes to the payment methods of transactions carried out in accordance with the methods applicable in Indonesia. The existing payment methods are changing to digital and starting to shift the existence of conventional methods. Gradually, new things emerged, such as digital payments, and e-wallets. People tend to make digital payments, especially for millennials who really like something simple and practical in paying for transactions. Along with the creation of various kinds of new technologies, it will certainly attract people to shop using non-cash payment methods [9]. Companies must be able to keep up with very fast changes



FIGURE 1. Artificial intelligence [1]

by adjusting the payment system using a digital system so that people can easily make transactions, so that all levels of society can enjoy using the platform, as shown in Figure 1.

Digital payment is a transaction payment without using cash and is done digitally. In digital payment, sellers and buyers will use an electronic system for transactions. Payment can also be interpreted as transferring an amount of money from the buyer to the recipient. Digital payment is a payment innovation created by artificial intelligence in technology. The digital payment process starts with the money being stored, processed, and received in the form of digital information and the transfer is carried out electronically where buyers are no longer bothered to pay in cash. By utilizing digital payments, transactions can be easier and more automated by the system. There are several ways to make digital payments, such as through available applications, payment cards, and electronic money. The main components of a digital payment system are payment applications, Internet networks, regulations and procedures for using these applications [10].

It is estimated that the use of digital payments will continue to develop in line with many e-commerce transactions in the business. Some of the factors that can influence digital development are as follows.

a) *Increasing number of smartphone users*

Smartphones are very important for a business. Today most people have smartphones or tablets. Therefore, digital payments will continue to grow because smartphones have become increasingly sophisticated. Smartphones are not only used as a means of communication, but can also be used to make online transactions. Online payment systems via smartphones have also varied, such as SMS banking, m-banking, and e-wallets. So it can be ascertained that technology is getting more advanced, so that there will be many new ways to make online transactions via mobile devices [11].

b) *Attendance of Millennials and Generation Z*

This group was born in the Internet generation, and did not know life before the existence of Internet networks and digital devices. This will indirectly affect their behavior. They prefer anything fast-paced and straightforward. Millennials and Generation Z have the highest interest in digital payment products and services. This certainly opens up great opportunities for online transactions to continue to grow. With digital payment, transactions can be done effectively and efficiently only through cell phones [12], as shown in Figure 2.

c) *Reducing the money supply*

In Indonesia, the payment system in general still uses cash. By transacting using cash, the amount of money in circulation can trigger inflation. Therefore, education is needed regarding the benefits of using electronic money, such as using digital payments in payment transactions. Digital payments make it very easy to meet needs because

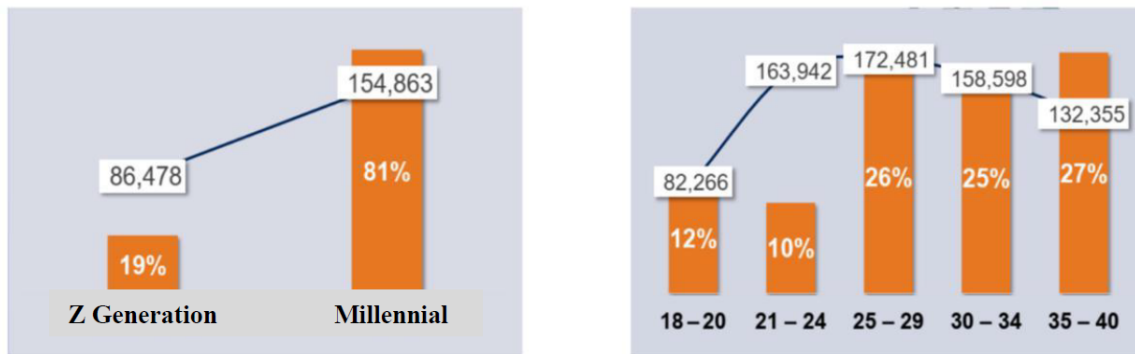


FIGURE 2. The use of e-wallet for the young generation [12]

people can shop anywhere without using cash. Thus the amount of money in circulation can be controlled [13].

The advantage of digital payment is that it can be used for [14]:

- 1) Make payments anywhere and anytime as long as the smartphone is connected to the Internet network.
- 2) Transact without the need to carry a lot of cash.
- 3) Transact in a short and easy time without the need to queue and waste energy.
- 4) Pay for shopping bills for several goods in one bill.

Digital payment will not develop without being followed by an increase in the security system in it, because payments and customer data will flow to the bank's data center and to merchants every time there is a transaction, many banks use artificial intelligence and machine learning to detect fraud. This technology can not only detect fraud but also prevent these fraudulent acts. Companies that own digital payment applications must realize how important it is to protect personal data because this data has an economic value that can be traded [15].

The Indonesian government in writing through the text of the law has provided legal protection against all legal actions related to information technology, including electronic transactions, namely by providing consumers with legal certainty to protect consumers from criminal acts. Protection is provided by paying attention to benefits, fairness, balance, security and safety of consumers as well as certainty of applicable laws. The purpose of this protection is to ensure that in the transaction process, neither the buyer nor the seller is harmed [16].

The digital payment system is carried out with the support of an Internet connection where the public sends the data needed by the company to validate transactions with the aim of knowing whether the online transaction was actually carried out by that person or not. During the transaction, there is no direct physical interaction but by sending proof of payment to confirm the transaction and the company can continue to the related parties so that the transaction process can run smoothly, safely, quickly and precisely.

In Indonesia, there are several types of digital payments that are very useful as means of online transactions, which are as follows.

a) *Mobile Banking*

It is a mobile banking application available in banking to support the needs of digital user transactions. Easy to use in transactions and safe. The public is given easy access at any time without having to go to an ATM, as seen in Figure 3.

b) *SMS Banking*

It is another digital payment application available in banking by registering the customer's mobile number, as seen in Figure 4.

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c) *Internet Banking*

It is a financial service application from banks that uses tokens to make transactions, as seen in Figure 5.



FIGURE 3. Mobile banking BRI [10]



FIGURE 4. BNI SMS banking (Author screenshot based on [13])

mandiri internet

[HOME](#) | [SITE MAP](#) | [CONTACT US](#)

Notes :

1. Fill in the column "Please Enter Your USER ID" with the USER ID , a combination of letters and numbers as many as 6-10 characters
2. Fill in the column "Please Enter Your Internet Banking PIN" with the secret code number , 6 digit number
3. If you have any questions regarding MANDIRI INTERNET, please contact **Mandiri** Call at **14000**.

LOGIN

Please Enter **USER ID** :

Please Enter Your **Internet Banking PIN** :

RESET **SEND**

Use Token PIN Mandiri for financial transaction

New User / Re-registration
Please [click here](#) to activate your Mandiri Internet services.

Forgot USER ID / PIN LOGIN?
Please [click here](#) for the activation.

Norton SECURED
powered by VeriSign
ABOUT SSL CERTIFICATES

FIGURE 5. Internet banking Mandiri (Author screenshot based on [13])

d) *Electronic Money (E-Money)*

In Indonesia, many companies have digital payment platforms in the form of e-money and has been registered with Bank Indonesia. The following are the most popular digital e-money payment services in Indonesia.

1) GoPay

GoPay is a fintech service owned by GoJek. GoPay can be used for several types of services such as online motorcycle taxi services or commonly known as Go-Ride, Go-Food, Go-Send, and others. The balance in GoPay can be used for online transactions such as credit purchases, and house cleaning services. Topping up can be done from mobile banking, ATM, minimarket or via the driver directly [17].

2) OVO

Similar to GoPay, OVO is a versatile, simple and safe application for all online transactions and there is also a loyalty rewards program for each use by collecting points for every payment transaction using OVO. There are many benefits offered by OVO to make it easy for its users without having to bother carrying large amounts of cash [18].

3) LinkAja

The application, formerly known as T-Cash LinkAja, is an application-based electronic money service to make online transactions easily and practically. Buy pulse or data Internet package voucher, pay merchants, pay bills, send donations, send money to pay insurance and apply for loans. LinkAja can be used by all Telkomsel customers such as Kartu Halo, Simpati, Kartu As, and LOOP. Customers also do not need to have an account at a bank as long as the customer has a Telkomsel number. The risk that exists from LinkAja is when the Telkomsel card that is used is lost, it can be used by the person who found the card. Mitigate the risk of loss so that it can be reported immediately to Grapari so that LinkAja accounts can be blocked [19].

4) DANA

DANA is a digital payment service application that makes it easy for users to make transactions. By downloading the DANA application from the Playstore or App store, the user can make transactions via a smartphone. To attract customers, DANA provides many discounts and cashbacks for every transaction at merchants that have cooperation. In fact, other benefits are offered, namely being able to transfer balances to relatives or closest friends and the money in the balance can be transferred back to the user's account. DANA also guarantees its users to be able to carry out transactions safely and reliably because technology security surveillance is carried out for 24 hours. Even the platform made by Indonesian citizen also guarantees its users a money back guarantee if something goes wrong when the user makes a transaction [20].

There are still many other digital e-money services such as ShopeePay, i.Saku, Sakuku, Doku, Jenius, PayTren, and True Money. The picture below is an illustration of the use of the top 4 digital payment applications in Indonesia, as seen in Figure 6.

5. Conclusion. The application of artificial intelligence greatly affects the way we live. The times that occurred in the industrial revolution 4.0 forced major changes to occur in the world of technology. Technological advances in the digital economy era cannot be avoided. With the rapid development of digital payment systems, it cannot be denied that digital payment systems have weaknesses. However, in general it can be said that the advantages of digital payment systems outweigh the disadvantages. Therefore, technological advances continue to innovate to produce better systems and are able to minimize system failures. The existence of this digital payment system does not mean eliminating a lot of cash circulating in the market. However, the existence of this digital payment system can



FIGURE 6. Digital payment in Indonesia [17]

reduce inflation and the money in circulation can be monitored so that it does not exceed the normal limit which is the cause of inflation. The development of this digital payment system must be continuously monitored so that there is no fraud that can harm people who carry out online transactions. Technological developments that continue to develop and continue to advance have produced new innovations, namely payments that can be made online and via smartphones, making millennials prefer to transact using digital payments rather than cash. Transactions using digital payments are not only effective and efficient but also have many other advantages, namely getting many other attractive promos such as cashback and discounts so that they are more economical. In the digital transformation process, the use of appropriate and customer-focused technology such as cloud technology and artificial intelligence is the key to helping retailers understand consumer behavior and preferences. It is intended that businesses can survive and even achieve success during a pandemic and this is called intelligent retail. Further context in the competitive world of business is related to data. Business competition in the industrial 4.0 era will be very tight and dynamic, because everything depends on the flow of data that flows and develops along with increasingly sophisticated technology.

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